

## Dissolved/Suspended/Settleable Solids Testing

### Total Dissolved Solids

A well-mixed sample is filtered through a standard glass fiber filter. The filtrate is evaporated to dryness in a weigh dish and dried to constant weight at 180°C. The increase in dish weight represents the total dissolved solids.

#### Apparatus:

Glass-fiber filter disks w/o organic binders  
Filtration apparatus  
Suction Flask  
Drying Oven 180 ± 2°C

#### Procedure:

- ◆ Insert filter disk with wrinkled side up into filtration apparatus.
- ◆ Apply vacuum and wash disk with three successive 20ml aliquots of DI water.
- ◆ Continue suction to remove all traces of water.
- ◆ Discard washings.
- ◆ Heat clean dish to 180 ± 2°C for one hour in an oven.
- ◆ Store in desiccator until needed.
- ◆ Weigh immediately before use.
- ◆ Choose sample volume to yield between 2.5 and 200mg dried residue.
  - ◆ If more than ten minutes are required to complete filtration, increase filter size or decrease sample volume but do not produce less than 2.5mg residue.
- ◆ Filter measured volume of well-mixed sample through glass-fiber filter.
- ◆ Wash with three successive 10ml aliquots of DI water, allowing complete drainage between washings, and continue suction for about three minutes after filtration is complete.
- ◆ Transfer filtrate to a weighed evaporation dish and evaporate to dryness on a steam bath.
- ◆ If filtrate volume exceeds dish capacity add successive portions to the same dish after evaporation.
- ◆ Dry dish for at least one hour in an oven at 180 ± 2°C
- ◆ Cool in a desiccator to balance temperature, and weigh.
- ◆ Repeat cycle of drying, cooling, desiccating, and weighing until a constant weight is obtained or until weight loss is less than 4% of previous weight or 0.5 mg, whichever is less.

#### Calculation:

$$\text{Total dissolved solids (mg/L)} = \left\{ \frac{(A - B) * 1000}{mlSample} \right\}$$

where: A = weight of dried residue + dish (mg)  
B = weight of dish (mg)

### Total Suspended Solids

A well-mixed sample is filtered through a weighed standard glass-fiber filter and the residue retained on the filter is dried to a constant weight at 103-105°C. The increase in weight of the filter represents the total suspended solids. If the suspended material clogs the filter and

prolongs filtration, the difference between the total solids and the dissolved solids may provide an estimate of the total suspended solids. In sample preparation, exclude large floating particles or submerged agglomerates of nonhomogeneous materials if it is determined that their inclusion is not desired in the final result. Because excessive residue on the filter may form a water-entrapping crust, limit the sample size to that yielding no more than 200mg residue. For samples high in dissolved solids thoroughly wash the filter to ensure removal of the dissolved materials. Prolonged filtration times resulting from filter clogging may produce high results owing to excessive solids captured on the clogged filter.

Apparatus: Same as for total dissolved solids  
Watch glass

Procedure:

Insert filter disk with wrinkled side up into filtration apparatus. Apply vacuum and wash disk with three successive 20ml aliquots of DI water. Continue suction to remove all traces of water. Discard washings.

Remove filter from filtration apparatus and transfer to a watch glass as a support. Dry at 103-105°C for 1 hour. Cool in the desiccator to balance temperature and weigh. Repeat cycle of drying, cooling, desiccating, and weighing until a constant weight is obtained or until weight loss is less than 0.5mg between successive weighings. Store in desiccator until needed. Weigh immediately before use.

Filter measured volume of well-mixed sample through glass-fiber filter. Wash with three successive 10ml aliquots of DI water, allowing complete drainage between washings. Continue suction for about three minutes after filtration is complete. Carefully remove filter from filtration apparatus and transfer to a watch glass as a support. Dry for at least one hour in an oven at 103-105°C, cool in a desiccator to balance temperature, and weigh. Repeat cycle of drying, cooling and weighing until a constant weight is obtained or until weight loss is less than 4% of previous weight or 0.5mg, whichever is less.

Calculation:

$$\text{Total suspended solids (mg/L)} = \left\{ \frac{(A - B) * 1000}{mlSample} \right\}$$

where: A = weight of filter + dried residue (mg)  
B = weight of filter (mg)

**Settleable Solids**

Settleable solids in surface and saline waters as well as domestic and industrial wastes may be determined and reported on either a volume (ml/L) or a weight (mg/L) basis.

Apparatus: For volumetric determination - Imhoff cones  
For gravimetric determination - All equipment for suspended solids and a glass vessel with a minimum diameter of 9 cm.

Procedure:

**Volumetric:** Fill an Imhoff cone to the 1 liter mark with a well-mixed sample. Settle for 45 minutes. Gently stir sides of cone with a rod or by spinning and let settle 15 minutes longer. Record volume of settleable solids in the cone as ml/L. If the settled matter contains pockets of liquid between large settled particles, estimate volume of these and subtract from volume of

settled solids. The practical lower limit of measurement depends on sample composition and generally is in the range of 0.1-1.0mg/L. Where a separation of settleable and floating material occurs, do not estimate the floating material as settleable matter.

*Gravimetric:* Pour a well-mixed sample into a glass vessel. Let stand quiescent for one hour. Without disturbing the settled or floating material, siphon 250ml from center of container at a point halfway between the surface of the settled material and the liquid surface. Determine total suspended solids (mg/L) of this supernatant liquor (see above). These are the nonsettleable solids.

Calculations:

$$\text{Settleable solids (mg/L)} = A - B$$

Where: A = Total suspended solids (mg/L)

B = Nonsettleable solids (mg/L)

EFFLUENT SOLIDS WORKSHEET

Wt. \_\_\_\_\_

Date\_\_\_\_\_

|                                  | ASH MT | BUCKEYE | CLOVER | GRANT EFF | GRANT INF |
|----------------------------------|--------|---------|--------|-----------|-----------|
| LAB NUMBER                       |        |         |        |           |           |
| TIME                             |        |         |        |           |           |
| SETTLEABLE SOLIDS<br>(ml / L)    |        |         |        |           |           |
|                                  |        |         |        |           |           |
| SUSPENDED SOLIDS                 |        |         |        |           |           |
| Filter wt.(mg)                   |        |         |        |           |           |
|                                  |        |         |        |           |           |
| average                          |        |         |        |           |           |
|                                  |        |         |        |           |           |
| Sample size in mls.              |        |         |        |           |           |
|                                  |        |         |        |           |           |
| Filter + dried sample (mg)       |        |         |        |           |           |
|                                  |        |         |        |           |           |
| average                          |        |         |        |           |           |
|                                  |        |         |        |           |           |
| Dried sample wt (mg)             |        |         |        |           |           |
|                                  |        |         |        |           |           |
| Total suspended solids<br>(mg/L) |        |         |        |           |           |

# INVENTORY LOG

| REF # | DATE<br>REC | ITEM | QUANT | LOT # | MAN. EXP<br>DATE | OPEN<br>DATE | OPEN EXP<br>DATE | DISPOSAL |        |
|-------|-------------|------|-------|-------|------------------|--------------|------------------|----------|--------|
|       |             |      |       |       |                  |              |                  | DATE     | AMOUNT |
|       |             |      |       |       |                  |              |                  |          |        |
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# SEMIANNUAL TEMPERATURE RECORD

INCUBATOR \_\_\_\_\_ WATERBATH \_\_\_\_\_ REFRIGERATOR \_\_\_\_\_

CERTIFIED THERMOMETER \_\_\_\_\_ INCUBATOR THERMOMETER \_\_\_\_\_  
 CORRECTION FACTOR \_\_\_\_\_ DATE \_\_\_\_\_  
 CERTIFIED THERMOMETER # \_\_\_\_\_

| MO. | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ | _____ |
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| 3   |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 4   |       |       |       |       |       |       |       |       |       |       |       |       |       |
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| 21  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 22  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 23  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 24  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 25  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 26  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 27  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 28  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 29  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 30  |       |       |       |       |       |       |       |       |       |       |       |       |       |
| 31  |       |       |       |       |       |       |       |       |       |       |       |       |       |

